

and L. Arons, conductivity and dielectric constants. An investigation as to whether the dielectric constant of a conductor is infinite, as often stated in text-books. A condenser was arranged to be filled with mixtures of anilin and benzol, xylol, mixtures of anilin and xylol in various proportions, &c., liquids being selected to avoid as far as possible residual charges. The capacities of this condenser were compared with that of an air-condenser, and arrangements were also made to measure the resistances on the bridge. The resistances of the three mixtures of anilin and xylol were 224,900, 1,383,000, and 18,780,000 Siemens's units, and their dielectric constants 1.590, 1.443, and 1.336. The authors conclude from these and other experiments that there is no necessary relation between the two constants; and, further, that the wide differences observed by Hopkinson between the square root of the dielectric constant and the index of refraction in certain vegetable oils cannot be explained by the conductivity.—E. Hoppe, on the theory of unipolar induction: experimental verification of Edlund's theory of the origin in terrestrial magnetism of auroral phenomena.—H. Jahn, on the equivalence of chemical energy and current energy. A discussion of Helmholtz's theory of the secondary heat of a voltaic element.—H. Jahn, on galvanic polarisation. A study of changes of polarisation of certain liquids with changes of temperature, together with deductions verifying Helmholtz's equations.—G. Adler, on the energy of magnetically polarised bodies.—E. Ketteler, addendum to the total reflection of crystals.—F. Koláček, on the gold-leaf spectroscopy. An attempt to calculate a calibration of the electroscope from its electrostatic capacity.

THE number of the *Nuovo Giornale Botanico Italiano* for April 1886 contains a number of short articles on various points relating to the flora of different parts of Italy, both phanerogamic and cryptogamic.—Sig. A. Mori describes and figures a singular instance of the production of a pitcher-like structure on the upper surface of a leaf of *Gunnera scabra*.—Dr. O. Mattirollo has examined the "mycorrhiza" of the roots of the sweet chestnut, and finds it to furnish a new example of polymorphism among the Hypocreaceæ. It consists largely of two species of fungus, which he names *Melanospora styranophora* and *M. Gibelliana*. The former is identical with *Stysanus Steminotis* and also with an *Acladium*, and presents an instance of "apandry," or the production of ascospores independently of the previous formation of a male organ. *M. Gibelliana* produces chlamydospores, and also the peculiar structures known as "spore-bulbils," which appear to replace the true ascophorous perithecia.

The most interesting article in the number for July is by Sig. A. Piccone, on the plants growing wild in Liguria which he terms "zoophilous" or "ornithophilous," i.e. those which are absolutely dependent for the germination of their seeds on the fruit being swallowed by birds.

## SOCIETIES AND ACADEMIES

### LONDON

**Entomological Society,** August 4.—Prof. J. O. Westwood, M.A., F.L.S., in the chair.—The following gentlemen were elected Fellows:—Lord Dormer, Messrs. J. H. A. Jenner, James Edwards, Morris Young, F. V. Theobald, E. A. Atmore, and William Saunders, President of the Entomological Society of Ontario.—Mr. Theodore Wood exhibited and made remarks on the following Coleoptera: an abnormal specimen of *Apion pallipes*; a series of *Langelandia anophthalmi*, from St. Peter's, Kent, taken in decaying seed-potatoes; a series of *Adelops wollastoni*, and *Anommatus 12-striatus*, also from decaying seed-potatoes; and a series of *Barypeithes pellucidus*, from the sea-shore near Margate. Mr. Wood also exhibited, on behalf of Dr. Ellis, of Liverpool, a specimen of *Apion annulipes*.—Prof. Westwood exhibited five specimens of a species of *Culex*, supposed to be either *C. cantans* or *C. lateralis*, sent to him by Mr. Douglas, who had received them from the Kent Water-Works. It was stated that they were very numerous in July last, and that persons bitten by them had suffered from "terrible swellings." Prof. Westwood also exhibited some galls found inside an acorn at Cannes in January last.—Mr. Billups exhibited a male and female of *Cleptes nitidula*, taken in copula in July last, at Benfleet, Essex, on the flowers of *Heracleum sphondylium*. He stated that it was probably the

rarest of the twenty-two known species of British *Chrysidide*, though it had been recorded from the New Forest and from Suffolk.—The Rev. W. W. Fowler announced that a series of specimens of *Homalium rugulipenne* had been received from Dr. Ellis, of Liverpool, for distribution amongst Members of the Society.—Mr. White exhibited a group of three specimens of *Lucanus cervus*, consisting of a female and two males. The female was in copula with one of the males, which, while so engaged, was attacked by the second male.—Mr. E. A. Fitch read a paper, communicated by Mr. G. Bowdler Buckton, on the occurrence in Britain of some undescribed *Aphides*.—Prof. Westwood read a paper on a tube-making homopterous insect from Ceylon.—Mr. Theodore Wood read a paper on *Bruchus*-infested beans. A discussion ensued, in which Prof. Westwood, the Rev. W. W. Fowler, and Messrs. Weir, Fitch, and Trimen took part.

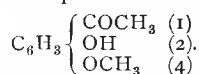
### PARIS

**Academy of Sciences,** August 16.—M. Fizeau in the chair.—The Secretary announced the loss sustained by the Academy in the death of M. Laguerre, Member of the Section for Geometry, who died on August 13 at Bar-le-Duc. At the obsequies, which took place on August 16, the Academy was represented by M. Halphen.—Remarks on the recent volcanic disturbances in the Northern Island, New Zealand, by M. Emile Blanchard. The author pointed out that this sudden display of igneous activity was a remarkable confirmation of the views already advocated by him in 1882 and 1884 on the subsidence of an austral continent during the modern geological age of the earth. He regarded the New Zealand Archipelago and more or less adjacent islands as a remnant of this continent, or at least of an extensive region, which had existed in a comparatively recent epoch, and he had already, in 1884, anticipated fresh convulsions, such as the tremendous catastrophe of which New Zealand had been the scene after a lengthened period of quiescence. Tarawera and other volcanoes supposed to be extinct have suddenly broken out into fresh activity; lava-streams have overspread vast spaces, and a romantic tract of country, the delight of the early explorers, has been wasted or swallowed up. Although the exact change that has taken place in the aspect of the land cannot be fully known for some time to come, the event already appears as an illustration of still more violent outbursts, which occurred in more or less remote ages. Thus it has been shown in this instance that the inductions drawn from a recently-created science already bear the character of certainty.—On the differential equation of a curve of any order, by Prof. Sylvester. It is shown that a direct and universal solution may be had of the following problem: To find the differential equation of a curve of the order  $n$ , where the function of the equation (with unity for constant term), whether  $U$  or  $(x, y, 1)^n$  is represented under the symbolic form  $u^n$ , where  $u = a + bx + y$ . It is added that the formulas given by M. Halphen in his "Recherches des points d'une courbe algébrique plane," &c., lead to the same results as those here arrived at.—On the employment of intermittent light for the measurement of rapid movements, by M. Gustave Hermite. Indicators of velocity at present in use always absorb a portion of the force of the machine to which they are applied. The author proposes to avoid this inconvenience by the arrangement here described, which, by an ingenious application of intermittent light, enables the observer to measure not only the number of revolutions of any machine, but the velocity of any rapid movement whatsoever, without exercising any mechanical action on the apparatus under examination.—On the mono-substituted haloid derivatives of acetonitril, by M. Louis Henry. The researches undertaken by the author on the functional solidarity and the volatility of the carbon compounds have led him to complete the series of these derivatives. Here he describes mono-ioduretted acetonitril,  $\text{ICH}_2\text{—CN}$ , and monobromuretted acetonitril,  $\text{BrCH}_2\text{—CN}$ , reserving for a future communication the comparative study of the mono-substituted haloid derivatives of acetonitril and acetate of methyl.—On the composition of the mineral waters of Bagnères-de-Luchon, Haute-Garonne, by M. Ed. Willm. It is shown that carbonic acid, far from being a negligible quantity in these and similar waters, as was supposed by the late M. Filhol, mostly occurs in a proportion more than sufficient to give a quantity of bicarbonates corresponding to the alkaline property of the water, independently of that which is due to the sulphuret. A complete analysis yielded sulphuric and carbonic acid, chlorine,

silica, ferric oxide, aluminium, sodium, potassium, calcium, magnesium, and traces of iodine, lithium, copper, ammonia, manganese, phosphoric and boric acid, but no arsenic.—Priestley's experiment repeated with aquatic animals and plants, by M. N. Gréhan. The experiment here referred to consists in placing under an air-tight vessel small mammals, such as mice, until the atmosphere becomes vitiated by the absorption of oxygen and liberation of carbonic acid; then, if a sprig of mint be introduced and the vessel exposed to the sun, after a certain time a mouse again introduced will breathe and live freely, the carbonic acid having been decomposed by the chlorophyll under the influence of the light and replaced by oxygen. An analogous experiment is here described with fish, and the leaves of an aquatic plant (*Potamogeton lucens*) introduced into receptacles filled with water.—Atmospheric phenomena observed at Palermo during the recent eruption of Etna, by M. A. Riccò. These light-effects are compared with those following the eruptions of Krakatō and Ferdinandea, their less brilliant character being attributed to the smaller quantity of vapours discharged by Etna.—The telluric currents, their nature, and the part played by them in the production of meteorological phenomena, by M. J. J. Landerer. In this paper, which is supplementary to the communication made to the Academy on October 17, 1881, the author gives the further results of the studies which he has now prosecuted for several years at Tortosa on the telluric currents and their various relations to terrestrial magnetism, the trade-winds, the solar spots, and the like.

## BERLIN

**Chemical Society, June 21.**—A. W. Hofmann, Vice-President, in the chair.—Prof. Scheibler described in a long and very interesting paper his new methods of obtaining a product rich in phosphorus from the crude slag produced in Thomas's process. Whilst formerly the slag was extracted with dilute hydrochloric acid, and a precipitate rich in phosphorus obtained by adding lime to the solution, the present price of hydrochloric acid rendered it desirable to simplify the process. It was at first attempted to do this by a fractional solidification of the fused slag, the portion first solidifying containing little phosphoric acid, whilst the liquid portion separated from it furnishes an excellent material for manure. An essentially better method consists in adding the lime to the iron, not all at once, but first of all about two-thirds of the necessary quantity; the slag produced is then removed, the remainder of the lime added, and the process completed. The first lot of slag obtained in this way contains about 31 per cent. phosphoric anhydride, and 58 per cent. lime, whilst the second lot contains but little phosphorus, though it is rich in iron, of which it contains 24 per cent., the first slag having only 1·8 per cent. The second slag is returned to the furnaces used in the production of crude iron. The advantages of the method are a shortening of the blowing operation, the possibility of increasing the charge, a more complete removal of the phosphorus, less loss of iron, and considerable saving of lime. Further advantages are that the first portion of the slag forms a valuable manure, whilst the second portion is used again in the furnaces. The paper concludes with a discussion of the importance of this more complete separation of the phosphorus from iron ores for agricultural purposes.—W. Will exhibited an aromatic ketone obtained from the root of *Paeonia Moutan*, and which has been more closely examined by Prof. Nagai, of Japan. Its composition is



—There were two papers by J. Traube: (1) on the size of maximum-drops of the ordinary alcohols and fatty acids, and their aqueous solutions; and (2) on the dependence of the size of drops on external influences.—K. Polstorff has found that East Indian holarrhena contains conessine, and he considers that this alkaloid is identical with Haines's wrightine.—K. Heumann and E. Mentha have studied the behaviour of monoclorazo- and hydrazobenzene to acids; the latter yields chlorazobenzene, parachloraniline, and aniline.—Piutti has obtained a new asparagin from vetch sprigs; its aqueous solutions are dextrorotatory, and its compounds have the same rotatory power as the corresponding compounds of ordinary asparagin, but the rotation is always in the opposite direction.—T. Salzer described a new method of obtaining pentathionic acid by oxidising a solution of sodium thiosulphate with iodine in the presence of potassium arsenite.—M. Lange de-

scribed a new synthesis of mixed azo-dyes from aromatic diamines.—G. Ciamician and P. Silber have studied the action of pyrrole on alloxan, and have described the properties and derivatives of pyrrolalloxan,  $\text{C}_8\text{H}_7\text{N}_3\text{O}_4$ , which results from the reaction.—J. Schmid showed that the colouring-matter of fisetwood (*Rhus cotinus*, L.), is not identical with quercitrine, and that it is present in the plant as a glucoside (*fustin*); he described the preparation and the ethyl- and acetyl-derivatives of fisetin.

## STOCKHOLM

**Geological Society, April 1.**—Prof. W. C. Brögger gave an account of the volcanic rocks extending between Langesund, in the Christiania Fjord, and Lake Mjösen, in Central Norway, founded on earlier and his own researches, the latter extending over many years. He had come to the conclusion that the whole basin was due to an erosion of the earth's crust, which had forced up the volcanic matter. The oldest of these, the augite porphyry, had been discharged in the form of lava streams over the Devonian surface of the earth. The more recent ones had not reached the surface, but had hardened at lower depths, and had become disclosed at a later date.—Herr A. E. Törnebohm described the remarkable coal-bearing rock which was discovered by Igelström some twenty years ago in the crystalline slates of the fundamental rock at the Nulla Mountain, in the province of Värmland. His microscopical researches went to show that the coal had been introduced into the rock whilst the formation of feldspar was still in progress.

## BOOKS AND PAMPHLETS RECEIVED

"Proceedings of the American Association, 34th Meeting" (Salem).—"Quarterly Journal of Microscopical Science," August (Churchill).—"Proceedings of the Linnean Society of New South Wales," and series, vol. i, part 1 (Cunningham, Sydney).—"Journal of the Royal Microscopical Society," August (Williams and Norgate).—"British Petrography," part 7, by J. J. H. Teall (Watson, Birmingham).—"Political Science Quarterly," vol. i, parts 1 and 2 (Ginn and Co., Boston).—"Avifauna Italica," by E. H. Giglioli (Firenze).—"Journal of the Asiatic Society of Bengal," vol. lv, parts 268 and 269.—"Annual Report of the Department of Revenue, Settlement, and Agriculture, 1884-85" (Madras).—"Schriften der physikalisch-ökonomischen Gesellschaft zu Königsberg i. Pr."—"Pond Life: Insects," by E. A. Butler (Sonnenschein).—"Papers in Inorganic Chemistry," by G. E. R. Ellis (Rivingtons).—"Report on the Meteorology of India in 1884" (Calcutta).—"Indian Meteorological Memoirs," vol. iii, part 1, vol. iv, part 1 (Calcutta).—"Bergens Museums Aarsberetning, 1885" (Bergen).

## CONTENTS

## PAGE

The Physiology of Plants . . . . .	381
A Plea for the Rain-Band . . . . .	382
Our Book Shelf:—	
"A Manual of Surgery" . . . . .	383
Cochin's "L'Évolution et la Vie" . . . . .	383
Cameron's "History of the Royal College of Surgeons in Ireland, &c." . . . .	384
Letters to the Editor:—	
Physiological Selection and the Origin of Species.—Prof. R. Meldola, F.R.S.; S. A. Mitra . . .	384
Red Sunsets and Volcanic Eruptions.—Prof. A. Riccò . . . . .	386
The Bright Clouds and the Aurora.—T. W. Backhouse . . . . .	386
Cloud Effect.—E. Brown . . . . .	387
The Crag Deposits on the North Downs.—Rev. A. Irving . . . . .	387
Actinotrocha of the British Coasts.—Prof. W. A. Herdman . . . . .	387
George Busk, F.R.S. By Prof. Geo. J. Allman, F.R.S. . . . .	387
British Association, Section B; Discussion on the Nature of Solution. By Prof. William A. Tilden . . . . .	389
The Recent Volcanic Eruptions in New Zealand. By Dr. James Hector, F.R.S. (With a Map) . . . . .	389
In Quest of the Origin of an Epidemic . . . . .	393
The Origin of Varieties. By Francis Galton, F.R.S. . . . .	395
Notes . . . . .	396
Astronomical Phenomena for the Week 1886	
August 29—September 4 . . . . .	398
Geographical Notes . . . . .	398
The Institution of Mechanical Engineers . . . . .	399
Progress of Chemistry and Mineralogy . . . . .	400
Scientific Serials . . . . .	402
Societies and Academies . . . . .	403
Books and Pamphlets Received . . . . .	404